What kinds of processes or events might cause the Earth's climate to change?

Movement of tectonic plates
Destruction of the Ozone layer
Pollution
Higher ocean levels
Pumping oil
Fires
Littering
Volcanoes
Acid Rain
Airplanes
Fertilizers, pesticides

Climate Change Unit

End Product (Unit Assessment)

After reading informational texts and examining climate change models, write a climate assessment report in which you discuss the current impacts of climate change on Earth's systems and evaluate which future predictions are most likely. What conclusions can you draw about possible response strategies to address the impact of climate change? Support your position with evidence from the text/s. Be sure to acknowledge competing views. Include charts to help convey your message to your readers.

Climate Change Unit
Activity 1 p. E84

I Will Be Able To (IWBAT) describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps. I will demonstrate my understanding in discussions with partners and written responses to prompts using vocabulary such as temperature, precipitation, and elevation.

Seré capaz de describirá el clima de mi comunidad a través de la observación de los datos de temperatura y precipitación y determinará qué características físicas de mi comunidad influyen en el clima local al observar los mapas topográficos. Demostraré mi comprensión en las discusiones con los socios y las respuestas escritas a las preguntas utilizando vocabulario como la temperatura, la precipitación y la elevación.

Climate Change Unit
Activity 1 p. E84

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 1, folder Activity 1,

1. **proceed to the assignment Climate Change Activity 1 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and What do you think? sections,**
4. **discuss your results as a table, and**
5. **complete Parts A & B of the Investigate with a partner.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 1, carpeta Actividad 1,

1. **proceder a la tarea Actividad 1 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? ¿y, qué piensas? secciones,**
4. **discuta sus resultados como una tabla, y**
5. **complete las Partes A y B de Investigar con un compañero.**

Climate Change Unit
Activity 1 p. E84
Digging Deeper

- Weather is the day to day and week to week temperture changes and precipitation
- Climate is the long term average of the weather - influenced by latitude, nearby geographic features, and elevation
- Latitude is the measure of the distance from a point on earth to the equator (Denver 39.7392 deg N, 104.9903 deg W)
- Closer to the equator receives more solar energy so are warmer than areas farther away from the equator - for every three degrees away from the equator, the temperature decreases one degree Fahrenheit
- The higher the elevation, the colder it gets (+1000ft in elevation, -3.6 deg F)
- The windward side of the mountains receive more moisture; the leeward side receives much less moisture (rain shadow)
- Denver is on the leeward side of the Rocky Mountains and so is drier
- Much more heat is needed to raise the temperature of water (higher heat capacity) than soil and rock; likewise, water cools much more slowly than soil and rock
- Oceans store heat during the summer and release it during the winter; summers are cooler and winters are warmer than they would be otherwise
- Lake-effect snow is common in late autumn and early winter when winds blow across warm water accumulating moisture and then cools dropping the moisture as snow over the cold land

IWBAT describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps.

Climate Change Unit
Activity 1 p. E84
Digging Deeper

- Warm oceans supply moisture that feeds major rainstorms along the coast and into the interior of the eastern and central US.
- Global climate is the entire Earth's climate expressed as a year-round average temperature as measured across the entire surface of the Earth
- Global climate is not constant, it has been warmer and colder than it is today
- It was much warmer when the dinosaurs roamed the Earth and much colder when glaciers covered much of North America

IWBAT describe the climate of my community through looking at temperature and precipitation data and determine what physical features in my community influence the local climate by looking at topographic maps.

Climate Change Unit 11/07/17
Activity 2 p. E96

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change. I will do this via small group and partner discussions, shared reading, written notes, and responding to questions using vocabulary such as sediment, climate and pollen.

Seré capaz de investigar y comprender la importancia de los anillos de los árboles, los núcleos de hielo glacial, el polen fósil y los sedimentos geológicos y glaciales como indicadores del cambio ambiental. Haré esto a través de discusiones en grupos pequeños y parejas, lectura compartida, notas escritas y respuestas a preguntas usando vocabulario como sedimentos, clima y polen.

Climate Change Unit
Activity 2 p. E96

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 2, folder Activity 2,

1. **proceed to the assignment Climate Change Activity 2 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 2, carpeta Actividad 2,

1. **proceder a la tarea Actividad 2 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

After the discussion:

- **Complete Parts A & B of the Investigate with a partner.**
- **The diagrams for Part A are available in the Activity 2 folder.**
- **The clay for Part B is on top of tan cabinet 9-12.**
- **The drawing in 2a may be done via Insert -> Drawing or you may do it on paper and then insert an image of that drawing into your document.**

Después de la discusión:

- **Complete las Partes A y B de Investigar con un compañero.**
- **Los diagramas para la Parte A están disponibles en la carpeta de la Actividad 2.**
- **La arcilla para la Parte B está encima del armario marrón 9-12.**
- **El dibujo en 2a se puede hacer a través de Insertar -> Dibujar o puede hacerlo en papel y luego insertar una imagen de ese dibujo en su documento.**

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96

Digging Deeper

- Paleoclimate - a climate that existed in the past (at least a few centuries ago)
- At present the Earth is experiencing an interglacial interval (a period of warmer climate after a glacial period)
- Earth has two continental ice sheets (Greenland & Antarctica) currently
- Continental glaciers occurred 20,000-8,000 years ago
- The climate from over 2,000 years ago cannot be accurately determined because we don't have written records from before that time. Scientists have to infer from other evidence.
- Something that represents something else is called a proxy
- Many kinds of evidence give an indirect record of past temperatures
- No proxy is perfect
- Pollen is easier to study because there is so much of it
- Geologists collect sediment from lakes or bogs and check the pollen levels
- The amount of pollen from a type of plant helps tell how many of that plant were around at the time
- Fossil plants and insects can help tell about a time's climate
- Drilling glaciers and examining their cores are a useful technique for determining climate
- The annual layers can be determined by changes in dust content

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96
Digging Deeper

- The average global temperature affects the proportion of isotopes in bubbles of air trapped in the ice. Hydrogen-1 and Hydrogen-2 are two of the isotopes that are measured. They are easily measured to high accuracy.
- Oxygen-16 and Oxygen-18 are also measured. Snowfall from times of warmer global climate contains a greater proportion of 18-O than cooler climate snowfall.
- Air bubbles in the ice contain carbon dioxide from the atmosphere of the time.
- The amount of CO_2 in the atmosphere can be correlated to global temperatures. During warmer times, atmospheric CO_2 is relatively high when compared to colder times of the paleoclimate.
- Dust can help infer past climates because in times of colder weather the winds tend to be stronger and dust spreads out across large areas.
- During colder climates foraminifera shells contain more oxygen-18. The shells spiral in the opposite direction in cold climates than they do in warm climates.
- Glaciers erode the rock and their sediments make distinctive landforms.
- Fine sediments are picked up by the wind and deposited arcoss wide areas called loess. There were several intervals of glaciation during the Pleistocene Epoch.
- Sediments of ice bergs sink to the bottom of the oceans and can be easily recognized because they're much coarser than other ocean sediments.
- Trees grow more during warm climates than cold.
- Bristlecone pines can live longer than 5000 years, so scientists can see long periods of climate history.

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit
Activity 2 p. E96
Digging Deeper

IWBAT investigate and understand the significance of tree rings, glacial ice cores, fossil pollen, and geologic and glacial sediments as indicators of environmental change.

Climate Change Unit 11/13/17

Writing prompt:
Week 2 folder

Solicitud de escritura:
Carpeta de la semana 2

Climate Change Unit 11/14/17
Activity 3 p. E105

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate. I will do this via small group and partner discussions, shared reading, written notes, and responding to questions using vocabulary such as axis, rotation, and orbit.

Seré capaz de investigar y comprender la influencia de la inclinación del eje de la Tierra sobre las estaciones y la forma de la órbita de la Tierra alrededor del sol sobre el clima. Haré esto a través de discusiones en grupos pequeños y parejas, lectura compartida, notas escritas y respuestas a preguntas utilizando vocabulario como eje, rotación y órbita.

Climate Change Unit
Activity 3 p. E105

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 3, folder Activity 3,

1. **proceed to the assignment Climate Change Activity 3 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 3, carpeta Actividad 3,

1. **proceder a la tarea Actividad 3 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105

After the discussion:

- **Complete Parts A2 through E of the Investigate with a partner.**
- **The diagrams for Part A are available on the tan cabinet.**
- **The materials for the succeeding parts are on the tan cabinet, as well.**
- **Part D: Construct a 1m section from twine instead of 3m from rope. Use butcher paper and a writing implement instead of the floor and chalk.**

Después de la discusión:

- Complete las Partes A2 a E de Investigar con un compañero.
- Los diagramas para la Parte A están disponibles en el armario café.
- Los materiales para las partes siguientes también están en el armario café.
- Parte D: Construya una sección de 1 m de hilo en lugar de 3 m de la cuerda. Use papel de carnicero y un implemento de escritura en lugar del piso y la tiza.

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105
Digging Deeper

- The Earth's axis is tilted at about 23.5 degrees from perpendicular to the plane of its orbit about the sun.
- The Summer solstice is on/about June 22; the winter solstice is on/about Dec. 22
- When the axis is tilted toward the sun it's summer; when it's tilted away from the sun it's winter
- Variations in the Earth's orbit around the sun are the major cause of the large variations in Earth's climate which cause the advance/retreat of ice sheets
- The tilt in the Earth's axis and its orbit would remain exactly the same if the Earth and the Sun were the only two bodies in the solar system
- The Earth's orbital parameters are the eccentricity, obliquity, and precession.
- The Earth's orbit has only a slight eccentricity (how far from being a circle it is)
- The Earth's orbital distance from the sun varies about 3.3% during a year. The difference in insolation is greater by about 7°. Insolation is the rate at which the sun's energy reaches the Earth per unit area. The variation is due to the inverse-square law.
- One full cycle of increase and decrease of eccentricity takes 100,000 years. Insolation varies from 2° (less than now) to 20° (much greater than now)
- Earth is closest to the sun on January 5 (perihelion) and farthest on July 5 (aphelion)

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit
Activity 3 p. E105
Digging Deeper

- Obliquity is the tilt of the Earth's axis relative to the plane of the Earth's orbit.
- A smaller obliquity means warmer winters and cooler summers; a larger obliquity would result in colder winters and hotter summers
- Earth's obliquity varies from 22° to 24.5°
- Obliquity changes over a period of about 40,000 years
- Since Earth's axis is not straight up & down, there is a wobble as it spins. Earth's axial precession takes about 26,000 years to make one revolution.
- In 11,000 years the winter solstice will be about the time of the aphelion, rather than near the perihelion like today. Winters will be colder and summers will be hotter than now in the northern hemisphere.
- The Earth's orbit's long axis orbits the sun (orbital precession)
- The two precession cycles interacting with the eccentricity affects how far the Earth is from the sun.
- Variations in Earth's climate are caused by how insolation varies with time and latitude
- Climatologists are trying to figure out how Milankovitch cycles trigger changes in climate. In the Antarctic ice core covering 420,000 years, there is a definite 100,000 year periodicity which nearly matches the 100,000 year periodicity of the eccentricity.
- Sea level, the parts of the water cycle, vegetation, and greenhouse gases all contribute to the dynamics of climate change.

IWBAT investigate and understand the influence of the tilt of the Earth's axis on the seasons and the shape of the Earth's orbit around the sun on climate.

Climate Change Unit 11/27/17
Activity 4 p. E117

IWBAT understand how ocean currents are affected by Earth's moving plates. I will do this through interpreting maps and participating in class discussion. I will demonstrate my understanding through orally answering questions and correctly using vocabulary such as climate and currents.

Seré capaz de entender cómo las corrientes oceánicas se ven afectadas por las placas móviles de la Tierra. Haré esto a través de la interpretación de mapas y la participación en la discusión en clase. Demostraré mi comprensión a través de preguntas que responden oralmente y el uso correcto de vocabulario como el clima y las corrientes.

Climate Change Unit
Activity 4 p. E117

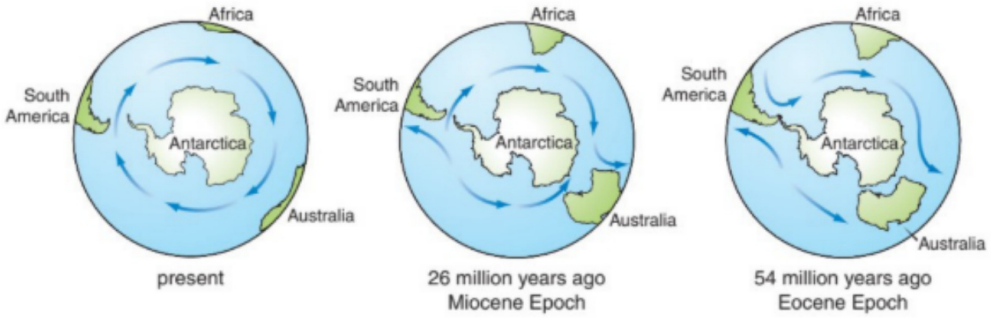
In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 4, folder Activity 4,

1. **proceed to the assignment Climate Change Activity 4 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 4, carpeta Actividad 4,

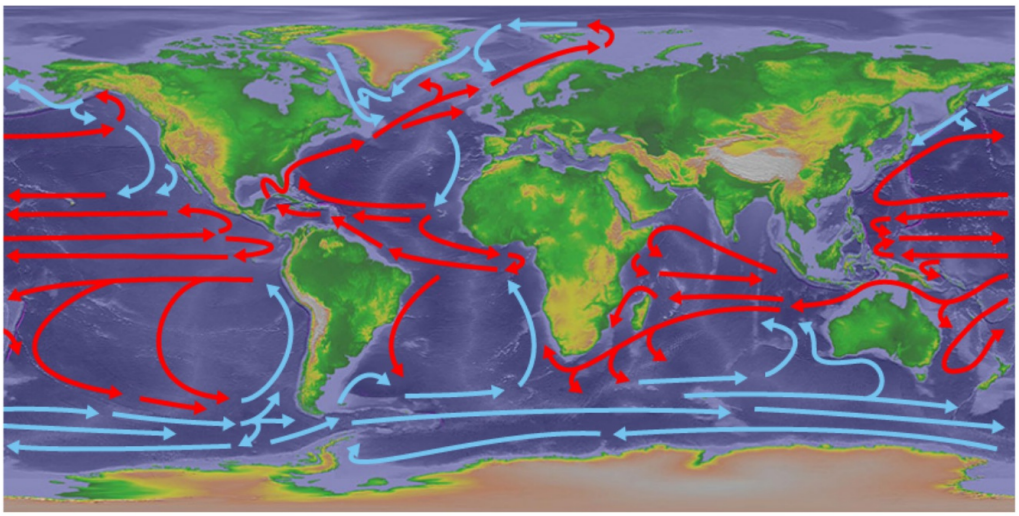
1. **proceder a la tarea Actividad 4 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT understand how ocean currents are affected by Earth's moving plates



IWBAT understand how ocean currents are affected by Earth's moving plates

Climate Change Unit
Activity 4 p. E117



IWBAT understand how ocean currents are affected by Earth's moving plates

Climate Change Unit
Activity 4 p. E117
Digging Deeper

- Oceans warm up and cool down more slowly than the land. Coastal currents affect the climate on the land.
- At higher latitudes, water is colder and more dense with a higher salinity
- At lower latitudes, water is warmer and less dense with lower salinity
- When the deep water current is disturbed, the entire planet is affected
- About 12,000 years ago glaciers were melting rapidly as Earth came out of a glacial age; the melt water decreased the salinity of the ocean water and reduced the density of the ocean water. This plunged the world into a 1,000 year cold period.
- The arrangement of the Earth's continents affect the global climate
- For an ice sheet to develop there has to be large land areas at high altitudes where snow can accumulate to form thick masses of ice
- About 200 million years ago all of Earth's continents formed a supercontinent, Pangea. Pangea rifted apart into several large pieces, one of which, Antarctica, drifted over the South pole.
- Most of Earth's continental land area is in the northern hemisphere
- Ice sheets can form during the parts of the Milankovitch cycles favorable to decreased temperatures

IWBAT understand how ocean currents affect regional and global climates.

Climate Change Unit
Activity 4 p. E117
Digging Deeper

- Increased activity at the plate margins can lead to volcanoes which can release carbon dioxide into the atmosphere. Volcanic eruptions can also release dust into the atmosphere which blocks solar radiation and reduces temperatures.
- Continent-continent collisions create large mountains. Erosion of these mountains uses up carbon dioxide from the atmosphere and reduces global temperatures.

IWBAT understand how ocean currents affect regional and global climates.

Climate Change Unit 11/29/17
Activity 5 p. E125

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature. I will do this through constructing and interpreting graphs with a partner.

Seré capaz de comparar datos para comprender la relación entre el dióxido de carbono y la temperatura global, evaluar los datos para llegar a una conclusión y reconocer un patrón de información en un gráfico para predecir la temperatura futura. Lo haré construyendo e interpretando gráficos con un compañero.

Climate Change Unit
Activity 5 p. E125

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 4, folder Activity 5,

1. **proceed to the assignment Climate Change Activity 5 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 4, carpeta Actividad 5,

1. **proceder a la tarea Actividad 5 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature.

Climate Change Unit
Activity 5 p. E125

After the discussion:

- **Complete Parts A and B of the Investigate with a partner.**
- **The graph paper for for Part A is available on the tan cabinet.**
- **There is a handout of the graph for Part B.**
- **We are not doing Part C.**

Después de la discusión:

- Complete las Partes A y B de Investigar con un compañero.
- El papel cuadriculado para la Parte A está disponible en el armario café.
- Hay un folleto del gráfico para la Parte B.
- No estamos haciendo la Parte C.

IWBAT compare data to understand the realationship of carbon dioxide to global temperature, evaluate the data to draw a conclusion, and recognize a pattern of information in a graph in order to predict future temperature.

Climate Change Unit
Activity 5 p. E125

Digging Deeper

- When there's carbon dioxide in the atmosphere, global temperatures are higher. There appears to be a correlation between carbon dioxide concentrations and global temperatures. Carbon dioxide is a greenhouse gas.
- Greenhouse gases keep the Earth warm enough for life. If the greenhouse gases are not in balance, deleterious effects may occur. Water vapor is the most important greenhouse gas. Other greenhouse gasses include methane and nitrogen oxides.
- Most solar radiation passes through the atmosphere w/o being absorbed. Wavelengths are shorter when surfaces are hotter. All objects radiate electromagnetic radiation. Earth radiates energy at longer wavelengths than the Sun.
- No greenhouse gases absorb all of the infrared radiation, but most of it is absorbed by different gases. They radiate the energy back to the Earth.
- Carbon dioxide is added to the atmosphere either via volcanic eruptions or oxidizing of organic matter (decaying and digesting of plant and animal matter). Oxidation of organic matter happens in the biosphere. Burning wood and fossil fuels causes carbon dioxide to be released into the atmosphere.
- Plants and algae in the ocean use carbon dioxide to make organic matter. CO_2 is always on the move, changing forms. It can only be removed from the active cycle by being burried deeply with sediment, but will return at a later geological time due to erosion.

Climate Change Unit
Activity 5 p. E125
Digging Deeper

- Carbon dioxide contributes to global warming. Over hundreds of thousands of years, global warming is caused by Milankovitch cycles.
- CO_2 concentrations are increasing due to the burning of fossil fuels. Scientists are concerned about the temperature of Earth increasing due to increases in CO_2 levels.
- Other nations are trying to reduce the total amount of greenhouse gases produced. They don't know the actual size of the contribution of CO_2 to global warming. Some people don't want to change how things are done because they make money in today's economy. The future is questionable and we don't know how rapidly global warming will take place.
- WE SHOULD NOT PUMP CO_2 INTO THE OCEANS. Not all CO_2 stays in the atmosphere. Some of it goes into bodies of water, plants (trees & grass), and animals. There's more forest land in the east of the USA taking in CO_2.

Climate Change Unit
Activity 6 p. E136

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, explain some of the effects of global warming, understand positive and negative feedback loops, and understand and evaluate the limitations of models in studying climate change through time. I will do this through group discussion, creating a poster, and writing down an experiment design on paper which could test an aspect of climate change. I will use vocabulary such as precipitation, plant life, and atmosphere.

Seré capaz de intercambiar ideas sobre cómo el cambio climático podría afectar a la Tierra y a mi comunidad, diseñar un experimento en papel para poner a prueba mis ideas, explicar algunos de los efectos del calentamiento global, comprender circuitos de retroalimentación positivos y negativos y comprender y evaluar las limitaciones de los modelos para estudiar el cambio climático a través del tiempo. Haré esto a través de una discusión grupal, creando un póster y escribiendo un diseño de experimento en papel que podría poner a prueba un aspecto del cambio climático. Usaré vocabulario como precipitación, vida vegetal y atmósfera.

Climate Change Unit
Activity 6 p. E136

In Schoology, course Earth Science 2, folder Unit 6 Climate Change, folder Week 5, folder Activity 6,

1. **proceed to the assignment Climate Change Activity 6 Notes & Questions,**
2. **open the attached document,**
3. **complete the What do you see? and Think about it sections,**
4. **discuss your results as a table, and**
5. **be prepared to discuss as a whole class.**

En Schoology, curso Earth Science 2, carpeta Unidad 6 Cambio climático, carpeta Semana 5, carpeta Actividad 6,

1. **proceder a la tarea Actividad 6 sobre Cambio Climático, Notas y Preguntas,**
2. **abra el documento adjunto,**
3. **completa el ¿Qué ves? y Piénsalo secciones,**
4. **discuta sus resultados como una tabla, y**
5. **prepárate para discutir como una clase completa**

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, and explain some of the effects of global warming.

Climate Change Unit
Activity 6 p. E136

After the discussion:

- **Complete steps 1-3 of the Investigate as a table group.**
  - **All partners must be listed in all partners' documents**
  - **All partners must list the remaining ideas on step 2**
- **The poster paper for for step 2 is available on the tan cabinet.**

Después de la discusión:

- Complete los pasos 1-3 de Investigar como un grupo de tablas.
  - Todos los socios deben figurar en todos los documentos de los socios
  - Todos los socios deben listar las ideas restantes en el paso 2
- El papel de póster para el paso 2 está disponible en el gabinete de bronceado.

IWBAT brainstorm ways climate change might affect the Earth and my community, design an experiment on paper to test my ideas, and explain some of the effects of global warming.

Climate Change Unit
Activity 6 p. E136
Digging Deeper

- It is warmer in urban areas due to pavement and less vegetation (urban heat island effect). Satellites make it easy to obtain a good estimate of global temperature. Variations in global temperatures were happening millennia before humans began releasing large quantities of CO_2 into the atmosphere. Scientists know that the global temperature is increasing, but they want to know if it's mankind or natural and how much does each contribute to the change.
- The ways of interaction with global climate change are called feedback loops. Many factors influence climate on Earth and scientists don't fully understand the interactions.
- Positive feedback occurs when two factors interact and the effects add up. Ice reflects a greater proportion of the Sun's radiation thereby causing the Earth to absorb less heat which causes the Earth to become cooler and form more ice.
- Understanding feedback loops is important to understanding how Earth's physical environment changes. Weathering and CO_2 are an example of a negative feedback loop.

IWBAT understand positive and negative feedback loops and understand and evaluate the limitations of models in studying climate change through time.

Climate Change Unit
Activity 6 p. E136
Digging Deeper

- Knowing how many feedback loops there are and exactly how they work makes it difficult to predict how the Earth will react to having more CO_2. More heat can cause more evaporation generating more clouds which can have either a cooling effect or a warming effect.
- Scientists are using their computer models to develop scenarios for what increased concentrations of greenhouse gases in the atmosphere will do to the climate.
- Increase in evaporation can lead to extreme weather events like hurricanes and winter snowstorms.
- Ice melt may cause a 1m rise in sea levels.
- Agriculture would be affected by rainfall patterns, some areas may become too dry and others too wet. Temperature changes may affect where crops are grown or their yields (they still grow in the same area, but produce less).
- If meltwater affects the NADW, there could be global consequences due to the change in distribution of solar heat around the globe.

IWBAT understand positive and negative feedback loops and understand and evaluate the limitations of models in studying climate change through time.